

This Listing of Claims will replace all prior versions, and listings, of Claims in the application:

Listing of Claims:

1. [Original] A method of producing hydrogen comprising: reacting water and a water-soluble oxygenated hydrocarbon having at least two carbon atoms, in the presence of a metal-containing catalyst, wherein the catalyst comprises a metal selected from the group consisting of Group VIII transitional metals, alloys thereof, and mixtures thereof.
2. [Original] The method of Claim 1, wherein the water and the oxygenated hydrocarbon are reacted at a temperature of from about 100°C to about 450°C, and at a pressure where the water and the oxygenated hydrocarbon are gaseous.
3. [Original] The method of Claim 1, wherein the water and the oxygenated hydrocarbon are reacted at a temperature of from about 100°C to about 300°C, and at a pressure where the water and the oxygenated hydrocarbon are gaseous.
4. [Currently Amended] [The method of Claim 1] A method of producing hydrogen comprising: reacting water and a water-soluble oxygenated hydrocarbon having at least two carbon atoms, in the presence of a metal-containing catalyst, wherein the catalyst comprises a metal selected from the group consisting of Group VIII transitional metals, alloys thereof, and mixtures thereof, and wherein the water and the oxygenated hydrocarbon are reacted at a temperature not greater than about 400°C, at a pressure where the water and the oxygenated hydrocarbon remain condensed liquids.

5. [Original] The method of Claim 1, wherein the water and the oxygenated hydrocarbon are reacted at a pH of from about 4.0 to about 10.0.
6. [Original] The method of Claim 1, wherein the catalyst comprises a metal selected from the group consisting of nickel, palladium, platinum, ruthenium, rhodium, iridium, alloys thereof, and mixtures thereof.
7. [Original] The method of Claim 1, wherein the catalyst is further alloyed or mixed with a metal selected from the group consisting of Group IB metals, Group IIB metals, and Group VIIb metals.
8. [Original] The method of Claim 1, wherein the catalyst is further alloyed or mixed with a metal selected from the group consisting of copper, zinc, and rhenium.
9. [Original] The method of Claim 1, wherein the catalyst is adhered to a support.
10. [Original] The method of Claim 9, wherein the support is selected from the group consisting of silica, alumina, zirconia, titania, ceria, carbon, silica-alumina, silica nitride, and boron nitride.
11. [Original] The method of Claim 9, wherein the support is surface-modified to remove surface moieties selected from the group consisting of hydrogen and hydroxyl.
12. [Original] The method of Claim 9, wherein the support is modified by treating it with a modifier selected from the group consisting of silanes, alkali compounds, and alkali earth compounds.

13. [Original] The method of Claim 9, wherein the support is silica modified with trimethylethoxysilane.

14. [Original] The method of Claim 9, wherein the support is a zeolite.

15. 44
[Currently Amended] [The method of Claim 9] A method of producing hydrogen comprising: reacting water and a water-soluble oxygenated hydrocarbon having at least two carbon atoms, in the presence of a metal-containing catalyst, wherein the catalyst comprises a metal selected from the group consisting of Group VIII transitional metals, alloys thereof, and mixtures thereof, and wherein the catalyst is adhered to a support comprising [the support is] a carbon nanotube or a carbon fullerene.

16. 45
[Currently Amended] [The method of Claim 9] A method of producing hydrogen comprising: reacting water and a water-soluble oxygenated hydrocarbon having at least two carbon atoms, in the presence of a metal-containing catalyst, wherein the catalyst comprises a metal selected from the group consisting of Group VIII transitional metals, alloys thereof, and mixtures thereof, and wherein the catalyst is adhered to a support comprising [the support is] a nanoporous support.

17. 46
[Currently Amended] [The method of Claim 1] A method of producing hydrogen comprising: reacting water and a water-soluble oxygenated hydrocarbon having at least two carbon atoms, in the presence of a metal-containing catalyst, wherein the catalyst comprises a metal selected from the group consisting of Group VIII transitional metals, alloys thereof, and mixtures thereof, and wherein the water and the oxygenated hydrocarbon are reacted at a

temperature not greater than about 400°C, at a pressure where the water and the oxygenated hydrocarbon remain condensed liquids, and further comprising reacting the water and the water-soluble hydrocarbon in the presence of a water-soluble salt of an alkali or alkali earth metal.

18. [Original] The method of Claim 17, wherein the water-soluble salt is selected from the group consisting of an alkali or an alkali earth metal hydroxide, carbonate, nitrate, or chloride salt.

19. [Original] The method of Claim 1, wherein the water-soluble oxygenated hydrocarbon has a carbon-to-oxygen ratio of 1:1.

20. [Currently Amended] [The method of Claim 1] A method of producing hydrogen comprising: reacting water and a water-soluble oxygenated hydrocarbon having at least two carbon atoms, in the presence of a metal-containing catalyst, wherein the catalyst comprises a metal selected from the group consisting of Group VIII transitional metals, alloys thereof, and mixtures thereof, and wherein the water-soluble oxygenated hydrocarbon has from 2 to 12 carbon atoms.

21. [Currently Amended] [The method of Claim 1] A method of producing hydrogen comprising: reacting water and a water-soluble oxygenated hydrocarbon having at least two carbon atoms, in the presence of a metal-containing catalyst, wherein the catalyst comprises a metal selected from the group consisting of Group VIII transitional metals, alloys thereof, and mixtures thereof, and wherein the water-soluble oxygenated hydrocarbon is selected from the group consisting of ethanediol, ethanedione, glycerol, glyceraldehyde,

aldotetroses, aldopentoses, aldohexoses, ketotetroses, ketopentoses, ketohexoses and alditols.

28. 30

[Currently Amended] The method of Claim [1] 21 wherein the water-soluble oxygenated hydrocarbon is selected from the group consisting of aldohexoses and corresponding alditols.

28. 31

[Currently Amended] The method of Claim [1] 21 wherein the water-soluble oxygenated hydrocarbon is selected from the group consisting of glucose and sorbitol.

28. 32

[Currently Amended] The method of Claim [1] 21 wherein the water-soluble oxygenated hydrocarbon is sucrose.

25. 1

[Original] A method of producing hydrogen comprising: reacting water and a water-soluble oxygenated hydrocarbon having at least two carbon atoms, at a temperature not greater than about 400°C, at a pressure where the water and the oxygenated hydrocarbon remain condensed liquids, and in the presence of a metal-containing catalyst, wherein the catalyst comprises a metal selected from the group consisting of Group VIII transitional metals, alloys thereof, and mixtures thereof.

26. 18

[Original] The method of Claim 25, wherein the catalyst comprises a metal selected from the group consisting of nickel, palladium, platinum, ruthenium, rhodium, iridium, alloys thereof, and mixtures thereof.

27. 19

[Original] The method of Claim 25, wherein the catalyst is further alloyed or mixed with a metal selected from the group consisting of Group IB metals, Group IIB metals, and Group VIIb metals.

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[Original] The method of Claim ~~25~~¹, wherein the catalyst is further alloyed or mixed with a metal selected from the group consisting of copper, zinc, and rhenium.

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[Original] The method of Claim ~~25~~¹, wherein the catalyst is adhered to a support.

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[Original] The method of Claim ~~29~~², wherein the support is selected from the group consisting of silica, alumina, zirconia, titania, ceria, carbon, silica-alumina, silica nitride, and boron nitride.

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32.
33.

[Original] The method of Claim ~~29~~², wherein the support is surface-modified to remove surface moieties selected from the group consisting of hydrogen and hydroxyl.

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[Original] The method of Claim ~~31~~³, wherein the support is modified by treating it with a modifier selected from the group consisting of silanes, alkali compounds, and alkali earth compounds.

6
34.

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[Original] The method of Claim ~~29~~², wherein the support is silica modified with trimethylethoxysilane.

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35.

2
[Original] The method of Claim ~~29~~², wherein the support is a zeolite.

8
36.

2
[Original] The method of Claim ~~29~~², wherein the support is a carbon nanotube or a carbon fullerene.

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37.

2
[Original] The method of Claim ~~29~~², wherein the support is a nanoporous support.

37.10

[Original] The method of Claim ~~25~~¹, further comprising reacting the water and the water-soluble oxygenated hydrocarbon in the presence of a water-soluble salt of an alkali or alkali earth metal.

38.11

[Original] The method of Claim ~~37~~¹⁰, wherein the water-soluble salt is selected from the group consisting of an alkali or an alkali earth metal hydroxide, carbonate, nitrate, or chloride salt.

39.12

[Original] The method of Claim ~~25~~¹, wherein the water-soluble oxygenated hydrocarbon has a carbon-to-oxygen ratio of 1:1.

40.13

[Original] The method of Claim ~~25~~¹, wherein the water-soluble oxygenated hydrocarbon has from 2 to 12 carbon atoms.

41.14

[Original] The method of Claim ~~25~~¹, wherein the water-soluble oxygenated hydrocarbon is selected from the group consisting of ethanediol, ethanedione, glycerol, glyceraldehyde, aldotetroses, aldopentoses, aldohexoses, ketotetroses, ketopentoses, ketohexoses, and alditols.

42.15

[Original] The method of Claim ~~25~~¹, wherein the water-soluble oxygenated hydrocarbon is selected from the group consisting of aldohexoses and corresponding alditols.

43.16

[Original] The method of Claim ~~25~~¹, wherein the water-soluble oxygenated hydrocarbon is selected from the group consisting of glucose and sorbitol.

44. 1/7

[Original] The method of Claim 25, wherein the water-soluble oxygenated hydrocarbon is sucrose.

45.

[Original] A method of producing hydrogen comprising: reacting water and a water-soluble oxygenated hydrocarbon having at least two carbon atoms, at a temperature of from about 100°C to about 450°C, and at a pressure where the water and the oxygenated hydrocarbon are gaseous, in the presence of a metal-containing catalyst, wherein the catalyst comprises a metal selected from the group consisting of Group VIII transitional metals, alloys thereof, and mixtures thereof, the catalyst being adhered to a support.

46. 1

[Original] The method of Claim 45, wherein the support is selected from the group consisting of silica, alumina, zirconia, titania, ceria, carbon, silica-alumina, silica nitride, and boron nitride, modified to remove surface moieties selected from the group consisting of hydrogen and hydroxyl.

47.

[Original] The method of Claim 46, wherein the support is modified by treating it with a modifier selected from the group consisting of silanes, alkali compounds, and alkali earth compounds.

48.

[Original] The method of Claim 45, wherein the support is silica modified with trimethylethoxysilane.

49.

[Original] The method of Claim 45, wherein the water-soluble oxygenated hydrocarbon has a carbon-to-oxygen ratio of 1:1.

50. 47

[Currently Amended] [The method of Claim 45] A method of producing hydrogen comprising: reacting water and a water-soluble oxygenated hydrocarbon

having at least two carbon atoms, at a temperature of from about 100°C to about 450°C, and at a pressure where the water and the oxygenated hydrocarbon are gaseous, in the presence of a metal-containing catalyst, wherein the catalyst comprises a metal selected from the group consisting of Group VIII transitional metals, alloys thereof, and mixtures thereof, the catalyst being adhered to a support, and wherein the water-soluble oxygenated hydrocarbon is selected from the group consisting of ethanediol, ethanedione, glycerol, glyceraldehyde, aldotetroses, aldopentoses, ketotetroses, ketopentoses, ketohexoses, and alditols.

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31.

Al

[Original] A method of producing hydrogen comprising: reacting water and a water-soluble oxygenated hydrocarbon having at least two carbon atoms, at a temperature of not greater than about 400°C, and at a pressure where the water and the oxygenated hydrocarbon remain condensed liquids, in the presence of a metal-containing catalyst, wherein the catalyst comprises a metal selected from the group consisting of Group VIII transitional metals, alloys thereof, and mixtures thereof, the catalyst being adhered to a support.

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52.

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[Original] The method of Claim 51, wherein the support is selected from the group consisting of silica, alumina, zirconia, titania, ceria, carbon, silica-alumina, silica nitride, and boron nitride, modified to render to remove surface moieties selected from the group consisting of hydrogen and hydroxyl.

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[Original] The method of Claim 52, wherein the support is modified by treating it with a modifier selected from the group consisting of silanes, alkali compounds, and alkali earth compounds.

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[Original] The method of Claim 51, wherein the support is silica modified with trimethylethoxysilane.

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55. 42

[Original] The method of Claim 38, wherein the water-soluble oxygenated hydrocarbon has a carbon-to-oxygen ratio of 1:1.

56. 43

[Original] The method of Claim 38, wherein the water-soluble oxygenated hydrocarbon is selected from the group consisting of ethanediol, ethanedione, glycerol, glyceraldehyde, aldotetroses, aldopentoses, aldohexoses, ketotetroses, ketopentoses, ketohexoses, and alditols.

57. 33

[New] The method of Claim 21, wherein the water and the oxygenated hydrocarbon are reacted at a temperature of from about 100°C to about 300°C.

58. 34

[New] The method of Claim 21, wherein the water and the oxygenated hydrocarbon are reacted at a pH of from about 4.0 to about 10.0.

59. 35

[New] The method of Claim 21, wherein the catalyst comprises a metal selected from the group consisting of nickel, palladium, platinum, ruthenium, rhodium, iridium, alloys thereof, and mixtures thereof.

60. 34

[New] The method of Claim 21, wherein the catalyst is further alloyed or mixed with a metal selected from the group consisting of Group IB metals, Group IIB metals, and Group VIIb metals.

61. 37

[New] The method of Claim 21, wherein the catalyst is further alloyed or mixed with a metal selected from the group consisting of copper, zinc, and rhenium.

62. 38

[New] The method of Claim 21, wherein the catalyst is adhered to a support.

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63.

[New] The method of Claim 62²², wherein the support is selected from the group consisting of silica, alumina, zirconia, titania, ceria, carbon, silica-alumina, silica nitride, and boron nitride.

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64.

[New] The method of Claim 62²², wherein the support is surface-modified to remove surface moieties selected from the group consisting of hydrogen and hydroxyl.

25
65.

[New] The method of Claim 62²², wherein the support is modified by treating it with a modifier selected from the group consisting of silanes, alkali compounds, and alkali earth compounds.

26
66.

[New] The method of Claim 62²², wherein the support is silica modified with trimethylethoxysilane.

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67.

[New] The method of Claim 62²², wherein the support is a zeolite.

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68.

[New] The method of Claim 62²², wherein the support is a carbon nanotube or a carbon fullerene.

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69.

[New] The method of Claim 62²², wherein the support is a nanoporous support.

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